SEQUENCE LISTING

<110> Frank, Markus

Sayegh, Mohamed

<120> A Gene Encoding a Multidrug Resistance Human P-Glycoprotein
Homologue on Chromosome 7p15-21 and Uses Thereof

<130> 81994/268611

<160> 19

<170> PatentIn version 3.0

<210> 1

<211> 659

<212> PRT

<213> Homo sapiens

<400> 1

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Met Leu Ala Glu Lys Gly Ala His Ala Glu Leu Met Ala Lys Arg Gly
1               5                   10                  15

Leu Tyr Tyr Ser Leu Val Met Ser Gln Asp Ile Lys Lys Ala Asp Glu
            20                  25                  30

Gln Met Glu Ser Met Thr Tyr Ser Thr Glu Arg Lys Thr Asn Ser Leu
        35                  40                  45

Pro Leu His Ser Val Lys Ser Ile Lys Ser Asp Phe Ile Asp Lys Ala
    50                  55                  60

Glu Glu Ser Thr Gln Ser Lys Glu Ile Ser Leu Pro Glu Val Ser Leu
65                  70                  75                  80

Leu Lys Ile Leu Lys Leu Asn Lys Pro Glu Trp Pro Phe Val Val Leu
                85                  90                  95

Gly Thr Leu Ala Ser Val Leu Asn Gly Thr Val His Pro Val Phe Ser
            100                 105                 110

Ile Ile Phe Ala Lys Ile Ile Thr Met Phe Gly Asn Asn Asp Lys Thr
        115                 120                 125

Thr Leu Lys His Asp Ala Glu Ile Tyr Ser Met Ile Phe Val Ile Leu
    130                 135                 140

Gly Val Ile Cys Phe Val Ser Tyr Phe Met Gln Gly Leu Phe Tyr Gly
145                 150                 155                 160
```

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Arg Ala Gly Glu Ile Leu Thr Met Arg Leu Arg His Leu Ala Phe Lys
            165                 170                 175

Ala Met Leu Tyr Gln Asp Ile Ala Trp Phe Asp Glu Lys Glu Asn Ser
            180                 185                 190

Thr Gly Gly Leu Thr Thr Ile Leu Ala Ile Asp Ile Ala Gln Ile Gln
            195                 200                 205

Gly Ala Thr Gly Ser Arg Ile Gly Val Leu Thr Gln Asn Ala Thr Asn
            210                 215                 220

Met Gly Leu Ser Val Ile Ile Ser Phe Ile Tyr Gly Trp Glu Met Thr
225                 230                 235                 240

Phe Leu Ile Leu Ser Ile Ala Pro Val Leu Ala Val Thr Gly Met Ile
            245                 250                 255

Glu Thr Ala Ala Met Thr Gly Phe Ala Asn Lys Asp Lys Gln Glu Leu
            260                 265                 270

Lys His Ala Gly Lys Ile Ala Thr Glu Ala Leu Glu Asn Ile Arg Thr
            275                 280                 285

Ile Val Ser Leu Thr Arg Glu Lys Ala Phe Glu Gln Met Tyr Glu Glu
            290                 295                 300

Met Leu Gln Thr Gln His Arg Asn Thr Ser Lys Lys Ala Gln Ile Ile
305                 310                 315                 320

Gly Ser Cys Tyr Ala Phe Ser His Ala Phe Ile Tyr Phe Ala Tyr Ala
            325                 330                 335

Ala Gly Phe Arg Phe Gly Ala Tyr Leu Ile Gln Ala Gly Arg Met Thr
            340                 345                 350

Pro Glu Gly Met Phe Ile Val Phe Thr Ala Ile Ala Tyr Gly Ala Met
            355                 360                 365

Ala Ile Gly Lys Thr Leu Val Leu Ala Pro Glu Tyr Ser Lys Ala Lys
            370                 375                 380

Ser Gly Ala Ala His Leu Phe Ala Leu Leu Glu Lys Lys Pro Asn Ile
385                 390                 395                 400

Asp Ser Arg Ser Gln Glu Gly Lys Lys Pro Asp Thr Cys Glu Gly Asn
            405                 410                 415

Leu Glu Phe Arg Glu Val Ser Phe Phe Tyr Pro Cys Arg Pro Asp Val
            420                 425                 430

Phe Ile Leu Arg Gly Leu Ser Leu Ser Ile Glu Arg Gly Lys Thr Val
            435                 440                 445

Ala Phe Val Gly Ser Ser Gly Cys Gly Lys Ser Thr Ser Val Gln Leu
            450                 455                 460

Leu Gln Arg Leu Tyr Asp Pro Val Gln Gly Gln Val Leu Phe Asp Gly
465                 470                 475                 480

Val Asp Ala Lys Glu Leu Asn Val Gln Trp Leu Arg Ser Gln Ile Ala
            485                 490                 495
```

3

Ile Val Pro Gln Glu Pro Val Leu Phe Asn Cys Ser Ile Ala Glu Asn
            500   505   510

Ile Ala Tyr Gly Asp Asn Ser Arg Val Val Pro Leu Asp Glu Ile Lys
            515   520   525

Glu Ala Ala Asn Ala Ala Asn Ile His Ser Phe Ile Glu Gly Leu Pro
            530   535   540

Glu Lys Tyr Asn Thr Gln Val Gly Leu Lys Gly Ala Gln Leu Ser Gly
545   550   555   560

Gly Gln Lys Gln Arg Leu Ala Ile Ala Arg Ala Leu Leu Gln Lys Pro
                565   570   575

Lys Ile Leu Leu Leu Asp Glu Ala Thr Ser Ala Leu Asp Asn Asp Ser
            580   585   590

Glu Lys Val Val Gln His Ala Leu Asp Lys Ala Arg Thr Gly Arg Thr
            595   600   605

Cys Leu Val Val Thr His Arg Leu Ser Ala Ile Gln Asn Ala Asp Leu
            610   615   620

Ile Val Val Leu His Asn Gly Lys Ile Lys Glu Gln Gly Thr His Gln
625   630   635   640

Glu Leu Leu Arg Asn Arg Asp Ile Tyr Phe Lys Leu Val Asn Ala Gln
                645   650   655

Ser Val Gln

<210>   2

<211>   812

<212>   PRT

<213>   Homo sapiens

<400>   2

Met Val Asp Glu Asn Asp Ile Arg Ala Leu Asn Val Arg His Tyr Arg
1   5   10   15

Asp His Ile Gly Val Val Ser Gln Glu Pro Val Leu Phe Gly Thr Thr
            20   25   30

Ile Ser Asn Asn Ile Lys Tyr Gly Arg Asp Asp Val Thr Asp Glu Glu
            35   40   45

Met Glu Arg Ala Ala Arg Glu Ala Asn Ala Tyr Asp Phe Ile Met Glu
            50   55   60

Phe Pro Asn Lys Phe Asn Thr Leu Val Gly Glu Lys Gly Ala Gln Met
65   70   75   80

Ser Gly Gly Gln Lys Gln Arg Ile Ala Ile Ala Arg Ala Leu Val Arg
                85   90   95

```
Asn Pro Lys Ile Leu Ile Leu Asp Glu Ala Thr Ser Ala Leu Asp Ser
        100                 105                 110

Glu Ser Lys Ser Ala Val Gln Ala Ala Leu Glu Lys Ala Ser Lys Gly
        115                 120                 125

Arg Thr Thr Ile Val Val Ala His Arg Leu Ser Thr Ile Arg Ser Ala
    130                 135                 140

Asp Leu Ile Val Thr Leu Lys Asp Gly Met Leu Ala Glu Lys Gly Ala
145                 150                 155                 160

His Ala Glu Leu Met Ala Lys Arg Gly Leu Tyr Tyr Ser Leu Val Met
                165                 170                 175

Ser Gln Asp Ile Lys Lys Ala Asp Glu Gln Met Glu Ser Met Thr Tyr
            180                 185                 190

Ser Thr Glu Arg Lys Thr Asn Ser Leu Pro Leu His Ser Val Lys Ser
        195                 200                 205

Ile Lys Ser Asp Phe Ile Asp Lys Ala Glu Glu Ser Thr Gln Ser Lys
    210                 215                 220

Glu Ile Ser Leu Pro Glu Val Ser Leu Leu Lys Ile Leu Lys Leu Asn
225                 230                 235                 240

Lys Pro Glu Trp Pro Phe Val Val Leu Gly Thr Leu Ala Ser Val Leu
            245                 250                 255

Asn Gly Thr Val His Pro Val Phe Ser Ile Ile Phe Ala Lys Ile Ile
            260                 265                 270

Thr Met Phe Gly Asn Asn Asp Lys Thr Thr Leu Lys His Asp Ala Glu
        275                 280                 285

Ile Tyr Ser Met Ile Phe Val Ile Leu Gly Val Ile Cys Phe Val Ser
    290                 295                 300

Tyr Phe Met Gln Gly Leu Phe Tyr Gly Arg Ala Gly Glu Ile Leu Thr
305                 310                 315                 320

Met Arg Leu Arg His Leu Ala Phe Lys Ala Met Leu Tyr Gln Asp Ile
            325                 330                 335

Ala Trp Phe Asp Glu Lys Glu Asn Ser Thr Gly Gly Leu Thr Thr Ile
        340                 345                 350

Leu Ala Ile Asp Ile Ala Gln Ile Gln Gly Ala Thr Gly Ser Arg Ile
        355                 360                 365

Gly Val Leu Thr Gln Asn Ala Thr Asn Met Gly Leu Ser Val Ile Ile
    370                 375                 380

Ser Phe Ile Tyr Gly Trp Glu Met Thr Phe Leu Ile Leu Ser Ile Ala
385                 390                 395                 400

Pro Val Leu Ala Val Thr Gly Met Ile Glu Thr Ala Ala Met Thr Gly
            405                 410                 415

Phe Ala Asn Lys Asp Lys Gln Glu Leu Lys His Ala Gly Lys Ile Ala
        420                 425                 430
```

```
Thr Glu Ala Leu Glu Asn Ile Arg Thr Ile Val Ser Leu Thr Arg Glu
        435                 440                 445

Lys Ala Phe Glu Gln Met Tyr Glu Glu Met Leu Gln Thr Gln His Arg
        450                 455                 460

Asn Thr Ser Lys Lys Ala Gln Ile Ile Gly Ser Cys Tyr Ala Phe Ser
465                 470                 475                 480

His Ala Phe Ile Tyr Phe Ala Tyr Ala Ala Gly Phe Arg Phe Gly Ala
                485                 490                 495

Tyr Leu Ile Gln Ala Gly Arg Met Thr Pro Glu Gly Met Phe Ile Val
            500                 505                 510

Phe Thr Ala Ile Ala Tyr Gly Ala Met Ala Ile Gly Lys Thr Leu Val
            515                 520                 525

Leu Ala Pro Glu Tyr Ser Lys Ala Lys Ser Gly Ala Ala His Leu Phe
        530                 535                 540

Ala Leu Leu Glu Lys Lys Pro Asn Ile Asp Ser Arg Ser Gln Glu Gly
545                 550                 555                 560

Lys Lys Pro Asp Thr Cys Glu Gly Asn Leu Glu Phe Arg Glu Val Ser
                565                 570                 575

Phe Phe Tyr Pro Cys Arg Pro Asp Val Phe Ile Leu Arg Gly Leu Ser
            580                 585                 590

Leu Ser Ile Glu Arg Gly Lys Thr Val Ala Phe Val Gly Ser Ser Gly
        595                 600                 605

Cys Gly Lys Ser Thr Ser Val Gln Leu Leu Gln Arg Leu Tyr Asp Pro
        610                 615                 620

Val Gln Gly Gln Val Leu Phe Asp Gly Val Asp Ala Lys Glu Leu Asn
625                 630                 635                 640

Val Gln Trp Leu Arg Ser Gln Ile Ala Ile Val Pro Gln Glu Pro Val
                645                 650                 655

Leu Phe Asn Cys Ser Ile Ala Glu Asn Ile Ala Tyr Gly Asp Asn Ser
                660                 665                 670

Arg Val Val Pro Leu Asp Glu Ile Lys Glu Ala Ala Asn Ala Ala Asn
        675                 680                 685

Ile His Ser Phe Ile Glu Gly Leu Pro Glu Lys Tyr Asn Thr Gln Val
        690                 695                 700

Gly Leu Lys Gly Ala Gln Leu Ser Gly Gly Gln Lys Gln Arg Leu Ala
705                 710                 715                 720

Ile Ala Arg Ala Leu Leu Gln Lys Pro Lys Ile Leu Leu Leu Asp Glu
                725                 730                 735

Ala Thr Ser Ala Leu Asp Asn Asp Ser Glu Lys Val Val Gln His Ala
            740                 745                 750

Leu Asp Lys Ala Arg Thr Gly Arg Thr Cys Leu Val Val Thr His Arg
        755                 760                 765
```

```
Leu Ser Ala Ile Gln Asn Ala Asp Leu Ile Val Val Leu His Asn Gly
    770             775             780
Lys Ile Lys Glu Gln Gly Thr His Gln Glu Leu Leu Arg Asn Arg Asp
785             790             795             800
Ile Tyr Phe Lys Leu Val Asn Ala Gln Ser Val Gln
            805             810
```

<210> 3

<211> 131

<212> PRT

<213> Homo sapiens

<400> 3

```
Met Val Asp Glu Asn Asp Ile Arg Ala Leu Asn Val Arg His Tyr Arg
1               5               10              15
Asp His Ile Gly Val Val Ser Gln Glu Pro Val Leu Phe Gly Thr Thr
            20              25              30
Ile Ser Asn Asn Ile Lys Tyr Gly Arg Asp Asp Val Thr Asp Glu Glu
        35              40              45
Met Glu Arg Ala Ala Arg Glu Ala Asn Ala Tyr Asp Phe Ile Met Glu
    50              55              60
Phe Pro Asn Lys Phe Asn Thr Leu Val Gly Glu Lys Gly Ala Gln Met
65              70              75              80
Ser Gly Gly Gln Lys Gln Arg Ile Ala Ile Ala Arg Ala Leu Val Arg
            85              90              95
Asn Pro Lys Ile Leu Ile Leu Asp Glu Ala Thr Ser Ala Leu Asp Ser
            100             105             110
Glu Ser Lys Ser Ala Val Gln Ala Ala Leu Glu Lys Asp Thr Pro Arg
        115             120             125
Tyr Ser Phe
    130
```

<210> 4

<211> 1058

<212> PRT

<213> Homo sapiens

<220>

<221> Note

<222> (66)..(66)

<223> Xaa at position 66 represents any L amino acid

<400> 4

Met Val Ile Ser Leu Thr Ser Lys Glu Leu Ser Ala Tyr Ser Lys Ala
1   5   10   15

Gly Ala Val Ala Glu Glu Val Leu Ser Ser Ile Arg Thr Val Ile Ala
            20   25   30

Phe Arg Ala Gln Glu Lys Glu Leu Gln Arg Ser Phe Leu Leu Asn Ile
            35   40   45

Thr Arg Tyr Ala Trp Phe Tyr Phe Pro Gln Trp Leu Leu Ser Cys Val
        50   55   60

Leu Xaa Phe Val Arg Tyr Thr Gln Asn Leu Lys Asp Ala Lys Asp Phe
65   70   75   80

Gly Ile Lys Arg Thr Ile Ala Ser Lys Val Ser Leu Gly Ala Val Tyr
                85   90   95

Phe Phe Met Asn Gly Thr Tyr Gly Leu Ala Phe Trp Tyr Gly Thr Ser
            100   105   110

Leu Ile Leu Asn Gly Glu Pro Gly Tyr Thr Ile Gly Thr Val Leu Ala
        115   120   125

Val Phe Phe Ser Val Ile His Ser Ser Tyr Cys Ile Gly Ala Ala Val
    130   135   140

Pro His Phe Glu Thr Phe Ala Ile Ala Arg Gly Ala Ala Phe His Ile
145   150   155   160

Phe Gln Val Ile Asp Lys Lys Pro Ser Ile Asp Asn Phe Ser Thr Ala
            165   170   175

Gly Tyr Lys Pro Glu Ser Ile Glu Gly Thr Val Glu Phe Lys Asn Val
            180   185   190

Ser Phe Asn Tyr Pro Ser Arg Pro Ser Ile Lys Ile Leu Lys Gly Leu
        195   200   205

Asn Leu Arg Ile Lys Ser Gly Glu Thr Val Ala Leu Val Gly Leu Asn
    210   215   220

Gly Ser Gly Lys Ser Thr Val Val Gln Leu Leu Gln Arg Leu Tyr Asp
225   230   235   240

Pro Asp Asp Gly Phe Ile Met Val Asp Glu Asn Asp Ile Arg Ala Leu
            245   250   255

Asn Val Arg His Tyr Arg Asp His Ile Gly Val Val Ser Gln Glu Pro
            260   265   270

Val Leu Phe Gly Thr Thr Ile Ser Asn Asn Ile Lys Tyr Gly Arg Asp
        275   280   285

Asp Val Thr Asp Glu Glu Met Glu Arg Ala Ala Arg Glu Ala Asn Ala
    290   295   300

```
Tyr Asp Phe Ile Met Glu Phe Pro Asn Lys Phe Asn Thr Leu Val Gly
305             310             315                 320

Glu Lys Gly Ala Gln Met Ser Gly Gly Gln Lys Gln Arg Ile Ala Ile
                325             330                 335

Ala Arg Ala Leu Val Arg Asn Pro Lys Ile Leu Ile Leu Asp Glu Ala
            340             345                 350

Thr Ser Ala Leu Asp Ser Glu Ser Lys Ser Ala Val Gln Ala Ala Leu
            355             360                 365

Glu Lys Ala Ser Lys Gly Arg Thr Thr Ile Val Val Ala His Arg Leu
            370             375             380

Ser Thr Ile Arg Ser Ala Asp Leu Ile Val Thr Leu Lys Asp Gly Met
385             390             395                 400

Leu Ala Glu Lys Gly Ala His Ala Glu Leu Met Ala Lys Arg Gly Leu
            405             410                 415

Tyr Tyr Ser Leu Val Met Ser Gln Asp Ile Lys Lys Ala Asp Glu Gln
            420             425                 430

Met Glu Ser Met Thr Tyr Ser Thr Glu Arg Lys Thr Asn Ser Leu Pro
            435             440                 445

Leu His Ser Val Lys Ser Ile Lys Ser Asp Phe Ile Asp Lys Ala Glu
            450             455             460

Glu Ser Thr Gln Ser Lys Glu Ile Ser Leu Pro Glu Val Ser Leu Leu
465                 470             475                 480

Lys Ile Leu Lys Leu Asn Lys Pro Glu Trp Pro Phe Val Val Leu Gly
            485             490                 495

Thr Leu Ala Ser Val Leu Asn Gly Thr Val His Pro Val Phe Ser Ile
            500             505             510

Ile Phe Ala Lys Ile Ile Thr Met Phe Gly Asn Asn Asp Lys Thr Thr
            515             520             525

Leu Lys His Asp Ala Glu Ile Tyr Ser Met Ile Phe Val Ile Leu Gly
            530             535             540

Val Ile Cys Phe Val Ser Tyr Phe Met Gln Gly Leu Phe Tyr Gly Arg
545                 550             555                 560

Ala Gly Glu Ile Leu Thr Met Arg Leu Arg His Leu Ala Phe Lys Ala
                565             570                 575

Met Leu Tyr Gln Asp Ile Ala Trp Phe Asp Glu Lys Glu Asn Ser Thr
            580             585                 590

Gly Gly Leu Thr Thr Ile Leu Ala Ile Asp Ile Ala Gln Ile Gln Gly
            595             600                 605

Ala Thr Gly Ser Arg Ile Gly Val Leu Thr Gln Asn Ala Thr Asn Met
            610             615                 620

Gly Leu Ser Val Ile Ile Ser Phe Ile Tyr Gly Trp Glu Met Thr Phe
625                 630             635                 640
```

Leu Ile Leu Ser Ile Ala Pro Val Leu Ala Val Thr Gly Met Ile Glu
            645   650   655

Thr Ala Ala Met Thr Gly Phe Ala Asn Lys Asp Lys Gln Glu Leu Lys
            660   665   670

His Ala Gly Lys Ile Ala Thr Glu Ala Leu Glu Asn Ile Arg Thr Ile
            675   680   685

Val Ser Leu Thr Arg Glu Lys Ala Phe Glu Gln Met Tyr Glu Glu Met
    690   695   700

Leu Gln Thr Gln His Arg Asn Thr Ser Lys Lys Ala Gln Ile Ile Gly
705   710   715   720

Ser Cys Tyr Ala Phe Ser His Ala Phe Ile Tyr Phe Ala Tyr Ala Ala
            725   730   735

Gly Phe Arg Phe Gly Ala Tyr Leu Ile Gln Ala Gly Arg Met Thr Pro
            740   745   750

Glu Gly Met Phe Ile Val Phe Thr Ala Ile Ala Tyr Gly Ala Met Ala
            755   760   765

Ile Gly Lys Thr Leu Val Leu Ala Pro Glu Tyr Ser Lys Ala Lys Ser
    770   775   780

Gly Ala Ala His Leu Phe Ala Leu Leu Glu Lys Lys Pro Asn Ile Asp
785   790   795   800

Ser Arg Ser Gln Glu Gly Lys Lys Pro Asp Thr Cys Glu Gly Asn Leu
            805   810   815

Glu Phe Arg Glu Val Ser Phe Phe Tyr Pro Cys Arg Pro Asp Val Phe
            820   825   830

Ile Leu Arg Gly Leu Ser Leu Ser Ile Glu Arg Gly Lys Thr Val Ala
            835   840   845

Phe Val Gly Ser Ser Gly Cys Gly Lys Ser Thr Ser Val Gln Leu Leu
    850   855   860

Gln Arg Leu Tyr Asp Pro Val Gln Gly Gln Val Leu Phe Asp Gly Val
865   870   875   880

Asp Ala Lys Glu Leu Asn Val Gln Trp Leu Arg Ser Gln Ile Ala Ile
            885   890   895

Val Pro Gln Glu Pro Val Leu Phe Asn Cys Ser Ile Ala Glu Asn Ile
            900   905   910

Ala Tyr Gly Asp Asn Ser Arg Val Val Pro Leu Asp Glu Ile Lys Glu
            915   920   925

Ala Ala Asn Ala Ala Asn Ile His Ser Phe Ile Glu Gly Leu Pro Glu
    930   935   940

Lys Tyr Asn Thr Gln Val Gly Leu Lys Gly Ala Gln Leu Ser Gly Gly
945   950   955   960

Gln Lys Gln Arg Leu Ala Ile Ala Arg Ala Leu Leu Gln Lys Pro Lys
            965   970   975

Ile Leu Leu Leu Asp Glu Ala Thr Ser Ala Leu Asp Asn Asp Ser Glu
        980   985   990

Lys Val Val Gln His Ala Leu Asp Lys Ala Arg Thr Gly Arg Thr Cys
        995   1000   1005

Leu Val Val Thr His Arg Leu Ser Ala Ile Gln Asn Ala Asp Leu
    1010   1015   1020

Ile Val Val Leu His Asn Gly Lys Ile Lys Glu Gln Gly Thr His
    1025   1030   1035

Gln Glu Leu Leu Arg Asn Arg Asp Ile Tyr Phe Lys Leu Val Asn
    1040   1045   1050

Ala Gln Ser Val Gln
    1055

<210> 5

<211> 1222

<212> PRT

<213> Homo sapiens

<220>

<221> Note

<222> (230)..(230)

<223> Xaa at position 230 represents any L amino acid

<400> 5

Met Ile Leu Gly Ile Leu Ala Ser Leu Val Asn Gly Ala Cys Leu Pro
1   5   10   15

Leu Met Pro Leu Val Leu Gly Glu Met Ser Asp Asn Leu Ile Ser Gly
        20   25   30

Cys Leu Val Gln Thr Asn Thr Tyr Ser Phe Phe Arg Leu Thr Leu Tyr
        35   40   45

Tyr Val Gly Ile Gly Val Ala Ala Leu Ile Phe Gly Tyr Ile Gln Ile
    50   55   60

Ser Leu Trp Ile Ile Thr Ala Ala Arg Gln Thr Lys Arg Ile Arg Lys
65   70   75   80

Gln Phe Phe His Ser Val Leu Ala Gln Asp Ile Gly Trp Phe Asp Ser
        85   90   95

Cys Asp Ile Gly Glu Leu Asn Thr Arg Met Thr Asp Ile Asp Lys Ile
        100   105   110

Ser Asp Gly Ile Gly Asp Lys Ile Ala Leu Leu Phe Gln Asn Met Ser
        115   120   125

```
Thr Phe Ser Ile Gly Leu Ala Val Gly Leu Val Lys Gly Trp Lys Leu
    130             135             140

Thr Leu Val Thr Leu Ser Thr Ser Pro Leu Ile Met Ala Ser Ala Ala
145             150             155             160

Ala Cys Ser Arg Met Val Ile Ser Leu Thr Ser Lys Glu Leu Ser Ala
            165             170             175

Tyr Ser Lys Ala Gly Ala Val Ala Glu Glu Val Leu Ser Ser Ile Arg
        180             185             190

Thr Val Ile Ala Phe Arg Ala Gln Glu Lys Glu Leu Gln Arg Ser Phe
        195             200             205

Leu Leu Asn Ile Thr Arg Tyr Ala Trp Phe Tyr Phe Pro Gln Trp Leu
    210             215             220

Leu Ser Cys Val Leu Xaa Phe Val Arg Tyr Thr Gln Asn Leu Lys Asp
225             230             235             240

Ala Lys Asp Phe Gly Ile Lys Arg Thr Ile Ala Ser Lys Val Ser Leu
            245             250             255

Gly Ala Val Tyr Phe Phe Met Asn Gly Thr Tyr Gly Leu Ala Phe Trp
            260             265             270

Tyr Gly Thr Ser Leu Ile Leu Asn Gly Glu Pro Gly Tyr Thr Ile Gly
        275             280             285

Thr Val Leu Ala Val Phe Phe Ser Val Ile His Ser Ser Tyr Cys Ile
        290             295             300

Gly Ala Ala Val Pro His Phe Glu Thr Phe Ala Ile Ala Arg Gly Ala
305             310             315             320

Ala Phe His Ile Phe Gln Val Ile Asp Lys Lys Pro Ser Ile Asp Asn
            325             330             335

Phe Ser Thr Ala Gly Tyr Lys Pro Glu Ser Ile Glu Gly Thr Val Glu
            340             345             350

Phe Lys Asn Val Ser Phe Asn Tyr Pro Ser Arg Pro Ser Ile Lys Ile
        355             360             365

Leu Lys Gly Leu Asn Leu Arg Ile Lys Ser Gly Glu Thr Val Ala Leu
    370             375             380

Val Gly Leu Asn Gly Ser Gly Lys Ser Thr Val Val Gln Leu Leu Gln
385             390             395             400

Arg Leu Tyr Asp Pro Asp Asp Gly Phe Ile Met Val Asp Glu Asn Asp
            405             410             415

Ile Arg Ala Leu Asn Val Arg His Tyr Arg Asp His Ile Gly Val Val
            420             425             430

Ser Gln Glu Pro Val Leu Phe Gly Thr Thr Ile Ser Asn Asn Ile Lys
        435             440             445

Tyr Gly Arg Asp Asp Val Thr Asp Glu Glu Met Glu Arg Ala Ala Arg
    450             455             460
```

```
Glu Ala Asn Ala Tyr Asp Phe Ile Met Glu Phe Pro Asn Lys Phe Asn
465             470             475                     480

Thr Leu Val Gly Glu Lys Gly Ala Gln Met Ser Gly Gly Gln Lys Gln
                485             490             495

Arg Ile Ala Ile Ala Arg Ala Leu Val Arg Asn Pro Lys Ile Leu Ile
            500             505             510

Leu Asp Glu Ala Thr Ser Ala Leu Asp Ser Glu Ser Lys Ser Ala Val
        515             520             525

Gln Ala Ala Leu Glu Lys Ala Ser Lys Gly Arg Thr Thr Ile Val Val
    530             535             540

Ala His Arg Leu Ser Thr Ile Arg Ser Ala Asp Leu Ile Val Thr Leu
545             550             555             560

Lys Asp Gly Met Leu Ala Glu Lys Gly Ala His Ala Glu Leu Met Ala
            565             570             575

Lys Arg Gly Leu Tyr Tyr Ser Leu Val Met Ser Gln Asp Ile Lys Lys
        580             585             590

Ala Asp Glu Gln Met Glu Ser Met Thr Tyr Ser Thr Glu Arg Lys Thr
        595             600             605

Asn Ser Leu Pro Leu His Ser Val Lys Ser Ile Lys Ser Asp Phe Ile
    610             615             620

Asp Lys Ala Glu Glu Ser Thr Gln Ser Lys Glu Ile Ser Leu Pro Glu
625             630             635             640

Val Ser Leu Leu Lys Ile Leu Lys Leu Asn Lys Pro Glu Trp Pro Phe
            645             650             655

Val Val Leu Gly Thr Leu Ala Ser Val Leu Asn Gly Thr Val His Pro
            660             665             670

Val Phe Ser Ile Ile Phe Ala Lys Ile Ile Thr Met Phe Gly Asn Asn
        675             680             685

Asp Lys Thr Thr Leu Lys His Asp Ala Glu Ile Tyr Ser Met Ile Phe
    690             695             700

Val Ile Leu Gly Val Ile Cys Phe Val Ser Tyr Phe Met Gln Gly Leu
705             710             715             720

Phe Tyr Gly Arg Ala Gly Glu Ile Leu Thr Met Arg Leu Arg His Leu
            725             730             735

Ala Phe Lys Ala Met Leu Tyr Gln Asp Ile Ala Trp Phe Asp Glu Lys
            740             745             750

Glu Asn Ser Thr Gly Gly Leu Thr Thr Ile Leu Ala Ile Asp Ile Ala
    755             760             765

Gln Ile Gln Gly Ala Thr Gly Ser Arg Ile Gly Val Leu Thr Gln Asn
    770             775             780

Ala Thr Asn Met Gly Leu Ser Val Ile Ile Ser Phe Ile Tyr Gly Trp
785             790             795             800
```

Glu Met Thr Phe Leu Ile Leu Ser Ile Ala Pro Val Leu Ala Val Thr
           805   810   815

Gly Met Ile Glu Thr Ala Ala Met Thr Gly Phe Ala Asn Lys Asp Lys
          820   825   830

Gln Glu Leu Lys His Ala Gly Lys Ile Ala Thr Glu Ala Leu Glu Asn
      835   840   845

Ile Arg Thr Ile Val Ser Leu Thr Arg Glu Lys Ala Phe Glu Gln Met
      850   855   860

Tyr Glu Glu Met Leu Gln Thr Gln His Arg Asn Thr Ser Lys Lys Ala
865   870   875   880

Gln Ile Ile Gly Ser Cys Tyr Ala Phe Ser His Ala Phe Ile Tyr Phe
          885   890   895

Ala Tyr Ala Ala Gly Phe Arg Phe Gly Ala Tyr Leu Ile Gln Ala Gly
          900   905   910

Arg Met Thr Pro Glu Gly Met Phe Ile Val Phe Thr Ala Ile Ala Tyr
      915   920   925

Gly Ala Met Ala Ile Gly Lys Thr Leu Val Leu Ala Pro Glu Tyr Ser
      930   935   940

Lys Ala Lys Ser Gly Ala Ala His Leu Phe Ala Leu Leu Glu Lys Lys
945   950   955   960

Pro Asn Ile Asp Ser Arg Ser Gln Glu Gly Lys Lys Pro Asp Thr Cys
          965   970   975

Glu Gly Asn Leu Glu Phe Arg Glu Val Ser Phe Phe Tyr Pro Cys Arg
          980   985   990

Pro Asp Val Phe Ile Leu Arg Gly Leu Ser Leu Ser Ile Glu Arg Gly
          995   1000   1005

Lys Thr Val Ala Phe Val Gly Ser Ser Gly Cys Gly Lys Ser Thr
    1010   1015   1020

Ser Val Gln Leu Leu Gln Arg Leu Tyr Asp Pro Val Gln Gly Gln
    1025   1030   1035

Val Leu Phe Asp Gly Val Asp Ala Lys Glu Leu Asn Val Gln Trp
    1040   1045   1050

Leu Arg Ser Gln Ile Ala Ile Val Pro Gln Glu Pro Val Leu Phe
    1055   1060   1065

Asn Cys Ser Ile Ala Glu Asn Ile Ala Tyr Gly Asp Asn Ser Arg
    1070   1075   1080

Val Val Pro Leu Asp Glu Ile Lys Glu Ala Ala Asn Ala Ala Asn
    1085   1090   1095

Ile His Ser Phe Ile Glu Gly Leu Pro Glu Lys Tyr Asn Thr Gln
    1100   1105   1110

Val Gly Leu Lys Gly Ala Gln Leu Ser Gly Gly Gln Lys Gln Arg
    1115   1120   1125

```
Leu Ala  Ile Ala Arg Ala Leu  Leu Gln Lys Pro Lys  Ile Leu Leu
    1130                1135                1140

Leu Asp  Glu Ala Thr Ser Ala  Leu Asp Asn Asp Ser  Glu Lys Val
    1145                1150                1155

Val Gln  His Ala Leu Asp Lys  Ala Arg Thr Gly Arg  Thr Cys Leu
    1160                1165                1170

Val Val  Thr His Arg Leu Ser  Ala Ile Gln Asn Ala  Asp Leu Ile
    1175                1180                1185

Val Val  Leu His Asn Gly Lys  Ile Lys Glu Gln Gly  Thr His Gln
    1190                1195                1200

Glu Leu  Leu Arg Asn Arg Asp  Ile Tyr Phe Lys Leu  Val Asn Ala
    1205                1210                1215

Gln Ser  Val Gln
    1220


<210>  6

<211>  1195

<212>  PRT

<213>  Homo sapiens


<400>  6

Met Ile Leu Gly Ile Leu Ala Ser Leu Val Asn Gly Ala Cys Leu Pro
1                 5                  10                  15

Leu Met Pro Leu Val Leu Gly Glu Met Ser Asp Asn Leu Ile Ser Gly
            20                  25                  30

Cys Leu Val Gln Thr Asn Thr Tyr Ser Phe Phe Arg Leu Thr Leu Tyr
        35                  40                  45

Tyr Val Gly Ile Gly Val Ala Ala Leu Ile Phe Gly Tyr Ile Gln Ile
    50                  55                  60

Ser Leu Trp Ile Ile Thr Ala Ala Arg Gln Thr Lys Arg Ile Arg Lys
65                  70                  75                  80

Gln Phe Phe His Ser Val Leu Ala Gln Asp Ile Gly Trp Phe Asp Ser
            85                  90                  95

Cys Asp Ile Gly Glu Leu Asn Thr Arg Met Thr Asp Ile Asp Lys Ile
            100                 105                 110

Ser Asp Gly Ile Gly Asp Lys Ile Ala Leu Leu Phe Gln Asn Met Ser
        115                 120                 125

Thr Phe Ser Ile Gly Leu Ala Val Gly Leu Val Lys Gly Trp Lys Leu
    130                 135                 140

Thr Leu Val Thr Leu Ser Thr Ser Pro Leu Ile Met Ala Ser Ala Ala
145                 150                 155                 160
```

```
Ala Cys Ser Arg Met Val Ile Ser Leu Thr Ser Lys Glu Leu Ser Ala
                165             170             175

Tyr Ser Lys Ala Gly Ala Val Ala Glu Glu Val Leu Ser Ser Ile Arg
            180             185             190

Thr Val Ile Ala Phe Arg Ala Gln Glu Lys Glu Leu Gln Arg Tyr Thr
            195             200             205

Gln Asn Leu Lys Asp Ala Lys Asp Phe Gly Ile Lys Arg Thr Ile Ala
        210             215             220

Ser Lys Val Ser Leu Gly Ala Val Tyr Phe Phe Met Asn Gly Thr Tyr
225             230             235             240

Gly Leu Ala Phe Trp Tyr Gly Thr Ser Leu Ile Leu Asn Gly Glu Pro
                245             250             255

Gly Tyr Thr Ile Gly Thr Val Leu Ala Val Phe Phe Ser Val Ile His
            260             265             270

Ser Ser Tyr Cys Ile Gly Ala Ala Val Pro His Phe Glu Thr Phe Ala
        275             280             285

Ile Ala Arg Gly Ala Ala Phe His Ile Phe Gln Val Ile Asp Lys Lys
    290             295             300

Pro Ser Ile Asp Asn Phe Ser Thr Ala Gly Tyr Lys Pro Glu Ser Ile
305             310             315             320

Glu Gly Thr Val Glu Phe Lys Asn Val Ser Phe Asn Tyr Pro Ser Arg
            325             330             335

Pro Ser Ile Lys Ile Leu Lys Gly Leu Asn Leu Arg Ile Lys Ser Gly
            340             345             350

Glu Thr Val Ala Leu Val Gly Leu Asn Gly Ser Gly Lys Ser Thr Val
            355             360             365

Val Gln Leu Leu Gln Arg Leu Tyr Asp Pro Asp Asp Gly Phe Ile Met
    370             375             380

Val Asp Glu Asn Asp Ile Arg Ala Leu Asn Val Arg His Tyr Arg Asp
385             390             395             400

His Ile Gly Val Val Ser Gln Glu Pro Val Leu Phe Gly Thr Thr Ile
            405             410             415

Ser Asn Asn Ile Lys Tyr Gly Arg Asp Asp Val Thr Asp Glu Glu Met
            420             425             430

Glu Arg Ala Ala Arg Glu Ala Asn Ala Tyr Asp Phe Ile Met Glu Phe
        435             440             445

Pro Asn Lys Phe Asn Thr Leu Val Gly Glu Lys Gly Ala Gln Met Ser
    450             455             460

Gly Gly Gln Lys Gln Arg Ile Ala Ile Ala Arg Ala Leu Val Arg Asn
465             470             475             480

Pro Lys Ile Leu Ile Leu Asp Glu Ala Thr Ser Ala Leu Asp Ser Glu
            485             490             495
```

Ser Lys Ser Ala Val Gln Ala Ala Leu Glu Lys Ala Ser Lys Gly Arg
        500   505   510

Thr Thr Ile Val Val Ala His Arg Leu Ser Thr Ile Arg Ser Ala Asp
        515   520   525

Leu Ile Val Thr Leu Lys Asp Gly Met Leu Ala Glu Lys Gly Ala His
    530   535   540

Ala Glu Leu Met Ala Lys Arg Gly Leu Tyr Tyr Ser Leu Val Met Ser
545   550   555   560

Gln Asp Ile Lys Lys Ala Asp Glu Gln Met Glu Ser Met Thr Tyr Ser
                565   570   575

Thr Glu Arg Lys Thr Asn Ser Leu Pro Leu His Ser Val Lys Ser Ile
            580   585   590

Lys Ser Asp Phe Ile Asp Lys Ala Glu Glu Ser Thr Gln Ser Lys Glu
        595   600   605

Ile Ser Leu Pro Glu Val Ser Leu Leu Lys Ile Leu Lys Leu Asn Lys
    610   615   620

Pro Glu Trp Pro Phe Val Val Leu Gly Thr Leu Ala Ser Val Leu Asn
625   630   635   640

Gly Thr Val His Pro Val Phe Ser Ile Ile Phe Ala Lys Ile Ile Thr
                645   650   655

Met Phe Gly Asn Asn Asp Lys Thr Thr Leu Lys His Asp Ala Glu Ile
            660   665   670

Tyr Ser Met Ile Phe Val Ile Leu Gly Val Ile Cys Phe Val Ser Tyr
        675   680   685

Phe Met Gln Gly Leu Phe Tyr Gly Arg Ala Gly Glu Ile Leu Thr Met
    690   695   700

Arg Leu Arg His Leu Ala Phe Lys Ala Met Leu Tyr Gln Asp Ile Ala
705   710   715   720

Trp Phe Asp Glu Lys Glu Asn Ser Thr Gly Gly Leu Thr Thr Ile Leu
                725   730   735

Ala Ile Asp Ile Ala Gln Ile Gln Gly Ala Thr Gly Ser Arg Ile Gly
            740   745   750

Val Leu Thr Gln Asn Ala Thr Asn Met Gly Leu Ser Val Ile Ile Ser
        755   760   765

Phe Ile Tyr Gly Trp Glu Met Thr Phe Leu Ile Leu Ser Ile Ala Pro
    770   775   780

Val Leu Ala Val Thr Gly Met Ile Glu Thr Ala Ala Met Thr Gly Phe
785   790   795   800

Ala Asn Lys Asp Lys Gln Glu Leu Lys His Ala Gly Lys Ile Ala Thr
                805   810   815

Glu Ala Leu Glu Asn Ile Arg Thr Ile Val Ser Leu Thr Arg Glu Lys
            820   825   830

Ala Phe Glu Gln Met Tyr Glu Glu Met Leu Gln Thr Gln His Arg Asn
    835   840   845

Thr Ser Lys Lys Ala Gln Ile Ile Gly Ser Cys Tyr Ala Phe Ser His
    850   855   860

Ala Phe Ile Tyr Phe Ala Tyr Ala Ala Gly Phe Arg Phe Gly Ala Tyr
865   870   875   880

Leu Ile Gln Ala Gly Arg Met Thr Pro Glu Gly Met Phe Ile Val Phe
         885   890   895

Thr Ala Ile Ala Tyr Gly Ala Met Ala Ile Gly Lys Thr Leu Val Leu
        900   905   910

Ala Pro Glu Tyr Ser Lys Ala Lys Ser Gly Ala Ala His Leu Phe Ala
      915   920   925

Leu Leu Glu Lys Lys Pro Asn Ile Asp Ser Arg Ser Gln Glu Gly Lys
    930   935   940

Lys Pro Asp Thr Cys Glu Gly Asn Leu Glu Phe Arg Glu Val Ser Phe
945   950   955   960

Phe Tyr Pro Cys Arg Pro Asp Val Phe Ile Leu Arg Gly Leu Ser Leu
        965   970   975

Ser Ile Glu Arg Gly Lys Thr Val Ala Phe Val Gly Ser Ser Gly Cys
        980   985   990

Gly Lys Ser Thr Ser Val Gln Leu Leu Gln Arg Leu Tyr Asp Pro Val
      995   1000   1005

Gln Gly Gln Val Leu Phe Asp Gly Val Asp Ala Lys Glu Leu Asn
    1010   1015   1020

Val Gln Trp Leu Arg Ser Gln Ile Ala Ile Val Pro Gln Glu Pro
    1025   1030   1035

Val Leu Phe Asn Cys Ser Ile Ala Glu Asn Ile Ala Tyr Gly Asp
    1040   1045   1050

Asn Ser Arg Val Val Pro Leu Asp Glu Ile Lys Glu Ala Ala Asn
    1055   1060   1065

Ala Ala Asn Ile His Ser Phe Ile Glu Gly Leu Pro Glu Lys Tyr
    1070   1075   1080

Asn Thr Gln Val Gly Leu Lys Gly Ala Gln Leu Ser Gly Gly Gln
    1085   1090   1095

Lys Gln Arg Leu Ala Ile Ala Arg Ala Leu Leu Gln Lys Pro Lys
    1100   1105   1110

Ile Leu Leu Leu Asp Glu Ala Thr Ser Ala Leu Asp Asn Asp Ser
    1115   1120   1125

Glu Lys Val Val Gln His Ala Leu Asp Lys Ala Arg Thr Gly Arg
    1130   1135   1140

Thr Cys Leu Val Val Thr His Arg Leu Ser Ala Ile Gln Asn Ala
    1145   1150   1155

```
Asp Leu  Ile Val Val Leu His  Asn Gly Lys Ile Lys  Glu Gln Gly
    1160              1165              1170
```

```
Thr His  Gln Glu Leu Leu Arg  Asn Arg Asp Ile Tyr  Phe Lys Leu
    1175              1180              1185
```

```
Val Asn  Ala Gln Ser Val Gln
    1190              1195
```

<210> 7

<211> 541

<212> PRT

<213> Homo sapiens

<220>

<221> Note

<222> (230)..(230)

<223> Xaa at position 230 represents any L amino acid

<400> 7

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Met Ile Leu Gly Ile Leu Ala Ser Leu Val Asn Gly Ala Cys Leu Pro
1               5               10              15
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```
Leu Met Pro Leu Val Leu Gly Glu Met Ser Asp Asn Leu Ile Ser Gly
        20              25              30
```

```
Cys Leu Val Gln Thr Asn Thr Tyr Ser Phe Phe Arg Leu Thr Leu Tyr
        35              40              45
```

```
Tyr Val Gly Ile Gly Val Ala Ala Leu Ile Phe Gly Tyr Ile Gln Ile
    50              55              60
```

```
Ser Leu Trp Ile Ile Thr Ala Ala Arg Gln Thr Lys Arg Ile Arg Lys
65              70              75              80
```

```
Gln Phe Phe His Ser Val Leu Ala Gln Asp Ile Gly Trp Phe Asp Ser
        85              90              95
```

```
Cys Asp Ile Gly Glu Leu Asn Thr Arg Met Thr Asp Ile Asp Lys Ile
        100             105             110
```

```
Ser Asp Gly Ile Gly Asp Lys Ile Ala Leu Leu Phe Gln Asn Met Ser
        115             120             125
```

```
Thr Phe Ser Ile Gly Leu Ala Val Gly Leu Val Lys Gly Trp Lys Leu
    130             135             140
```

```
Thr Leu Val Thr Leu Ser Thr Ser Pro Leu Ile Met Ala Ser Ala Ala
145             150             155             160
```

```
Ala Cys Ser Arg Met Val Ile Ser Leu Thr Ser Lys Glu Leu Ser Ala
            165             170             175
```

```
Tyr Ser Lys Ala Gly Ala Val Ala Glu Glu Val Leu Ser Ser Ile Arg
        180             185             190

Thr Val Ile Ala Phe Arg Ala Gln Glu Lys Glu Leu Gln Arg Ser Phe
        195             200             205

Leu Leu Asn Ile Thr Arg Tyr Ala Trp Phe Tyr Phe Pro Gln Trp Leu
    210             215             220

Leu Ser Cys Val Leu Xaa Phe Val Arg Tyr Thr Gln Asn Leu Lys Asp
225             230             235             240

Ala Lys Asp Phe Gly Ile Lys Arg Thr Ile Ala Ser Lys Val Ser Leu
            245             250             255

Gly Ala Val Tyr Phe Phe Met Asn Gly Thr Tyr Gly Leu Ala Phe Trp
            260             265             270

Tyr Gly Thr Ser Leu Ile Leu Asn Gly Glu Pro Gly Tyr Thr Ile Gly
        275             280             285

Thr Val Leu Ala Val Phe Phe Ser Val Ile His Ser Ser Tyr Cys Ile
        290             295             300

Gly Ala Ala Val Pro His Phe Glu Thr Phe Ala Ile Ala Arg Gly Ala
305             310             315             320

Ala Phe His Ile Phe Gln Val Ile Asp Lys Lys Pro Ser Ile Asp Asn
            325             330             335

Phe Ser Thr Ala Gly Tyr Lys Pro Glu Ser Ile Glu Gly Thr Val Glu
            340             345             350

Phe Lys Asn Val Ser Phe Asn Tyr Pro Ser Arg Pro Ser Ile Lys Ile
        355             360             365

Leu Lys Gly Leu Asn Leu Arg Ile Lys Ser Gly Glu Thr Val Ala Leu
        370             375             380

Val Gly Leu Asn Gly Ser Gly Lys Ser Thr Val Val Gln Leu Leu Gln
385             390             395             400

Arg Leu Tyr Asp Pro Asp Asp Gly Phe Ile Met Val Asp Glu Asn Asp
            405             410             415

Ile Arg Ala Leu Asn Val Arg His Tyr Arg Asp His Ile Gly Val Val
        420             425             430

Ser Gln Glu Pro Val Leu Phe Gly Thr Thr Ile Ser Asn Asn Ile Lys
        435             440             445

Tyr Gly Arg Asp Asp Val Thr Asp Glu Glu Met Glu Arg Ala Ala Arg
    450             455             460

Glu Ala Asn Ala Tyr Asp Phe Ile Met Glu Phe Pro Asn Lys Phe Asn
465             470             475             480

Thr Leu Val Gly Glu Lys Gly Ala Gln Met Ser Gly Gly Gln Lys Gln
            485             490             495

Arg Ile Ala Ile Ala Arg Ala Leu Val Arg Asn Pro Lys Ile Leu Ile
        500             505             510
```

Leu Asp Glu Ala Thr Ser Ala Leu Asp Ser Glu Ser Lys Ser Ala Val
    515   520   525

Gln Ala Ala Leu Glu Lys Asp Thr Pro Arg Tyr Ser Phe
    530   535   540

<210> 8

<211> 514

<212> PRT

<213> Homo sapiens

<400> 8

Met Ile Leu Gly Ile Leu Ala Ser Leu Val Asn Gly Ala Cys Leu Pro
1   5   10   15

Leu Met Pro Leu Val Leu Gly Glu Met Ser Asp Asn Leu Ile Ser Gly
            20   25   30

Cys Leu Val Gln Thr Asn Thr Tyr Ser Phe Phe Arg Leu Thr Leu Tyr
        35   40   45

Tyr Val Gly Ile Gly Val Ala Ala Leu Ile Phe Gly Tyr Ile Gln Ile
    50   55   60

Ser Leu Trp Ile Ile Thr Ala Ala Arg Gln Thr Lys Arg Ile Arg Lys
65   70   75   80

Gln Phe Phe His Ser Val Leu Ala Gln Asp Ile Gly Trp Phe Asp Ser
                85   90   95

Cys Asp Ile Gly Glu Leu Asn Thr Arg Met Thr Asp Ile Asp Lys Ile
            100   105   110

Ser Asp Gly Ile Gly Asp Lys Ile Ala Leu Leu Phe Gln Asn Met Ser
        115   120   125

Thr Phe Ser Ile Gly Leu Ala Val Gly Leu Val Lys Gly Trp Lys Leu
    130   135   140

Thr Leu Val Thr Leu Ser Thr Ser Pro Leu Ile Met Ala Ser Ala Ala
145   150   155   160

Ala Cys Ser Arg Met Val Ile Ser Leu Thr Ser Lys Glu Leu Ser Ala
            165   170   175

Tyr Ser Lys Ala Gly Ala Val Ala Glu Glu Val Leu Ser Ser Ile Arg
        180   185   190

Thr Val Ile Ala Phe Arg Ala Gln Glu Lys Glu Leu Gln Arg Tyr Thr
        195   200   205

Gln Asn Leu Lys Asp Ala Lys Asp Phe Gly Ile Lys Arg Thr Ile Ala
    210   215   220

Ser Lys Val Ser Leu Gly Ala Val Tyr Phe Phe Met Asn Gly Thr Tyr
225   230   235   240

```
Gly Leu Ala Phe Trp Tyr Gly Thr Ser Leu Ile Leu Asn Gly Glu Pro
                245                 250                 255

Gly Tyr Thr Ile Gly Thr Val Leu Ala Val Phe Phe Ser Val Ile His
                260                 265                 270

Ser Ser Tyr Cys Ile Gly Ala Ala Val Pro His Phe Glu Thr Phe Ala
            275                 280                 285

Ile Ala Arg Gly Ala Ala Phe His Ile Phe Gln Val Ile Asp Lys Lys
        290                 295                 300

Pro Ser Ile Asp Asn Phe Ser Thr Ala Gly Tyr Lys Pro Glu Ser Ile
305                 310                 315                 320

Glu Gly Thr Val Glu Phe Lys Asn Val Ser Phe Asn Tyr Pro Ser Arg
                325                 330                 335

Pro Ser Ile Lys Ile Leu Lys Gly Leu Asn Leu Arg Ile Lys Ser Gly
                340                 345                 350

Glu Thr Val Ala Leu Val Gly Leu Asn Gly Ser Gly Lys Ser Thr Val
                355                 360                 365

Val Gln Leu Leu Gln Arg Leu Tyr Asp Pro Asp Asp Gly Phe Ile Met
        370                 375                 380

Val Asp Glu Asn Asp Ile Arg Ala Leu Asn Val Arg His Tyr Arg Asp
385                 390                 395                 400

His Ile Gly Val Val Ser Gln Glu Pro Val Leu Phe Gly Thr Thr Ile
                405                 410                 415

Ser Asn Asn Ile Lys Tyr Gly Arg Asp Asp Val Thr Asp Glu Glu Met
            420                 425                 430

Glu Arg Ala Ala Arg Glu Ala Asn Ala Tyr Asp Phe Ile Met Glu Phe
        435                 440                 445

Pro Asn Lys Phe Asn Thr Leu Val Gly Glu Lys Gly Ala Gln Met Ser
    450                 455                 460

Gly Gly Gln Lys Gln Arg Ile Ala Ile Ala Arg Ala Leu Val Arg Asn
465                 470                 475                 480

Pro Lys Ile Leu Ile Leu Asp Glu Ala Thr Ser Ala Leu Asp Ser Glu
                485                 490                 495

Ser Lys Ser Ala Val Gln Ala Ala Leu Glu Lys Asp Thr Pro Arg Tyr
            500                 505                 510

Ser Phe


<210>  9

<211>  2066

<212>  DNA

<213>  Homo sapiens
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<400>   9

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atttgattgt gaccctaaag gatggaatgc tggcggagaa aggagcacat gctgaactaa       120

tggcaaaacg aggtctatat tattcacttg tgatgtcaca ggatattaaa aaagctgatg       180

aacagatgga gtcaatgaca tattctactg aaagaaagac caactcactt cctctgcact       240

ctgtgaagag catcaagtca gacttcattg acaaggctga ggaatccacc caatctaaag       300

agataagtct tcctgaagtc tctctattaa aaattttaaa gttaaacaag cctgaatggc       360

ctttgtggt tctggggaca ttggcttctg ttctaaatgg aactgttcat ccagtatttt       420

ccatcatctt tgcaaaaatt ataaccatgt ttggaaataa tgataaaacc acattaaagc       480

atgatgcaga aatttattcc atgatattcg tcattttggg tgttatttgc tttgtcagtt       540

atttcatgca gggattattt tacggcagag caggggaaat tttaacgatg agattaagac       600

acttggcctt caaagccatg ttatatcagg atattgcctg gtttgatgaa aaggaaaaca       660

gcacaggagg cttgacaaca atattagcca tagatatagc acaaattcaa ggagcaacag       720

gttccaggat tggcgtctta acacaaaatg caactaacat gggactttca gttatcattt       780

cctttatata tggatgggag atgacattcc tgattctgag tattgctcca gtacttgccg       840

tgacaggaat gattgaaacc gcagcaatga ctggatttgc caacaaagat aagcaagaac       900

ttaagcatgc tggaaagata gcaactgaag ctttggagaa tatacgtact atagtgtcat       960

taacaaggga aaaagccttc gagcaaatgt atgaagagat gcttcagact caacacagaa      1020

atacctcgaa gaaagcacag attattggaa gctgttatgc attcagccat gcctttatat      1080

attttgccta tgcagcaggg tttcgatttg gagcctattt aattcaagct ggacgaatga      1140

ccccagaggg catgttcata gtttttactg caattgcata tggagctatg gccatcggaa      1200

aaacgctcgt tttggctcct gaatattcca agccaaatc gggggctgcg catctgtttg      1260

ccttgttgga aaagaaacca aatatagaca gccgcagtca agaagggaaa aagccagaca      1320

catgtgaagg gaatttagag tttcgagaag tctctttctt ctatccatgt cgcccagatg      1380

ttttcatcct ccgtggctta tccctcagta ttgagcgagg aaagacagta gcatttgtgg      1440

ggagcagcgg ctgtgggaaa agcacttctg ttcaacttct gcagagactt tatgacccccg      1500

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gttcccaaat agcaatcgtt cctcaagagc ctgtgctctt caactgcagc attgctgaga      1620

acatcgccta tggtgacaac agccgtgtgg tgccattaga tgagatcaaa gaagccgcaa      1680

atgcagcaaa tatccattct tttattgaag gtctccctga gaaatacaac acacaagttg      1740

gactgaaagg agcacagctt tctggcggcc agaaacaaag actagctatt gcaagggctc      1800

ttctccaaaa acccaaaatt ttattgttgg atgaggccac ttcagccctc gataatgaca      1860
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gtgagaaggt ggttcagcat gcccttgata aagccaggac gggaaggaca tgcctagtgg    1920

tcactcacag gctctctgca attcagaacg cagatttgat agtggttctg cacaatggaa    1980

agataaagga acaaggaact catcaagagc tcctgagaaa tcgagacata tattttaagt    2040

tagtgaatgc acagtcagtg cagtga                                         2066
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<210>   10

<211>   2856

<212>   DNA

<213>   Homo sapiens

<400>   10
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ttagtgtaat ccatagcagt tattgcattg gagcagcagt ccctcattat tgataagaaa     180

cccagtatag ataacttttc cacagctgga tataaacctg aatccataga aggaactgtg     240

gaatttaaaa atgtttcttt caattatcca tcaagaccat ctatcaagat tctgaaaggt     300

ctgaatctca gaattaagtc tggagagaca gtcgccttgg tcggtctcaa tggcagtggg     360

aagagtacgg tagtccagct tctgcagagg ttatatgatc cggatgatgg ctttatcatg     420

gtggatgaga atgacatcag agctttaaat gtgcggcatt atcgagacca tattggagtg     480

gttagtcaag agcctgtttt gttcgggacc accatcagta acaatatcaa gtatggacga     540

gatgatgtga ctgatgaaga gatggagaga gcagcaaggg aagcaaatgc gtatgatttt     600

atcatggagt ttcctaataa atttaataca ttggtagggg aaaaaggagc tcaaatgagt     660

ggagggcaga acagaggat cgcaattgct cgtgccttag ttcgaaaccc caagattctg     720

attttagatg aggctacgtc tgccctggat tcagaaagca agtcagctgt tcaagctgca     780

ctggagaagg cgagcaaagg tcggactaca atcgtggtag cacaccgact ttctactatt     840

cgaagtgcag atttgattgt gaccctaaag gatggaatgc tggcggagaa aggagcacat     900

gctgaactaa tggcaaaacg aggtctatat tattcacttg tgatgtcaca ggatattaaa     960

aaagctgatg aacagatgga gtcaatgaca tattctactg aaagaaagac caactcactt    1020

cctctgcact ctgtgaagag catcaagtca gacttcattg acaaggctga ggaatccacc    1080

caatctaaag agataagtct tcctgaagtc tctctattaa aaattttaaa gttaaacaag    1140

cctgaatggc cttttgtggt tctggggaca ttggcttctg ttctaaatgg aactgttcat    1200

ccagtatttt ccatcatctt tgcaaaaatt ataaccatgt ttggaaataa tgataaaacc    1260

acattaaagc atgatgcaga aatttattcc atgatattcg tcattttggg tgttatttgc    1320
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```
tttgtcagtt atttcatgca gggattattt tacggcagag caggggaaat tttaacgatg    1380

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aaggaaaaca gcacaggagg cttgacaaca atattagcca tagatatagc acaaattcaa    1500

ggagcaacag gttccaggat tggcgtctta acacaaaatg caactaacat gggactttca    1560

gttatcattt cctttatata tggatgggag atgacattcc tgattctgag tattgctcca    1620

gtacttgccg tgacaggaat gattgaaacc gcagcaatga ctggatttgc caacaaagat    1680

aagcaagaac ttaagcatgc tggaaagata gcaactgaag ctttggagaa tatacgtact    1740

atagtgtcat taacaaggga aaaagccttc gagcaaatgt atgaagagat gcttcagact    1800

caacacagaa atacctcgaa gaaagcacag attattggaa gctgttatgc attcagccat    1860

gcctttatat attttgccta tgcagcaggg tttcgatttg gagcctattt aattcaagct    1920

ggacgaatga ccccagaggg catgttcata gttttactg caattgcata tggagctatg     1980

gccatcggaa aaacgctcgt tttggctcct gaatattcca aagccaaatc gggggctgcg    2040

catctgtttg ccttgttgga aaagaaacca aatatagaca gccgcagtca agaagggaaa    2100

aagccagaca catgtgaagg gaatttagag tttcgagaag tctctttctt ctatccatgt    2160

cgcccagatg ttttcatcct ccgtggctta tccctcagta ttgagcgagg aaagacagta    2220

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gcaagggctc ttctccaaaa acccaaaatt ttattgttgg atgaggccac ttcagccctc    2640

gataatgaca gtgagaaggt ggttcagcat gcccttgata aagccaggac gggaaggaca    2700

tgcctagtgg tcactcacag gctctctgca attcagaacg cagatttgat agtggttctg    2760

cacaatggaa agataaagga acaaggaact catcaagagc tcctgagaaa tcgagacata    2820

tattttaagt tagtgaatgc acagtcagtg cagtga                             2856
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<210> 11

<211> 1175

<212> DNA

<213> Homo sapiens

<400> 11
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ttagtgtaat ccatagcagt tattgcattg gagcagcagt ccctcattat tgataagaaa     180

cccagtatag ataacttttc cacagctgga tataaacctg aatccataga aggaactgtg     240

gaatttaaaa atgtttcttt caattatcca tcaagaccat ctatcaagat tctgaaaggt     300

ctgaatctca gaattaagtc tggagagaca gtcgccttgg tcggtctcaa tggcagtggg     360

aagagtacgg tagtccagct tctgcagagg ttatatgatc cggatgatgg ctttatcatg     420

gtggatgaga atgacatcag agctttaaat gtgcggcatt atcgagacca tattggagtg     480

gttagtcaag agcctgtttt gttcgggacc accatcagta acaatatcaa gtatggacga     540

gatgatgtga ctgatgaaga gatggagaga gcagcaaggg aagcaaatgc gtatgatttt     600

atcatggagt ttcctaataa atttaataca ttggtagggg aaaaaggagc tcaaatgagt     660

ggagggcaga aacagaggat cgcaattgct cgtgccttag ttcgaaaccc caagattctg     720

attttagatg aggctacgtc tgccctggat tcagaaagca agtcagctgt tcaagctgca     780

ctggagaagg atacccccag gtattcattt tgacctaatt tcacctcaag tggagaatcg     840

ctgaccttga accagcgccc ttcgacagct ctggcccctc aaacctcacc ctgacctcct     900

gctgcctatg agctactgca catacctcaa ggccatatgc agttgtggcc ctgcaccaaa     960

ttacactgaa tctaggaggg gagttggcag tggcggtatg aaaaaccatt gaacagtttt    1020

ctcgatggcc tgactccctt ataaaccaga gccttcagac cccttacaag gcttaatggc    1080

acattttact ttgcatttgc ttggaagtga gttaagcgtt tttttttctc taagaaaatc    1140

gcaggcttct ttttttaaaa tgctgacttt atgga                              1175
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<210> 12

<211> 3177

<212> DNA

<213> Homo sapiens

<220>

<221> Note

<222> (198)..(198)

<223> n at position 198 represents any nucleotide (A, T, C or G)

<400> 12

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caaaggtctt tccttttaaa tataacaaga tatgcttggt tttattttcc ccagtggcta     180
ctaagttgtg ttctgttntt tgtaaggtat acacagaatc tcaaagatgc aaaggatttt     240
ggcataaaaa ggactatagc ttcaaaagtg tctcttggtg ctgtgtactt ctttatgaat     300
ggaacctatg gacttgcttt ttggtatgga acctccttga ttcttaatgg agaacctgga     360
tataccatcg ggactgttct tgctgttttc tttagtgtaa tccatagcag ttattgcatt     420
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gaatccatag aaggaactgt ggaatttaaa aatgtttctt caattatcc atcaagacca      600
tctatcaaga ttctgaaagg tctgaatctc agaattaagt ctggagagac agtcgccttg     660
gtcggtctca atggcagtgg aagagtacg gtagtccagc ttctgcagag gttatatgat      720
ccggatgatg gctttatcat ggtggatgag aatgacatca gagctttaaa tgtgcggcat     780
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gaagcaaatg cgtatgattt tatcatggag tttcctaata aatttaatac attggtaggg     960
gaaaaaggag ctcaaatgag tggagggcag aaacagagga tcgcaattgc tcgtgcctta    1020
gttcgaaacc ccaagattct gattttagat gaggctacgt ctgccctgga ttcagaaagc    1080
aagtcagctg ttcaagctgc actggagaag gcgagcaaag tcggactac aatcgtggta     1140
gcacaccgac tttctactat tcgaagtgca gatttgattg tgaccctaaa ggatggaatg    1200
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gttctaaatg gaactgttca tccagtattt tccatcatct ttgcaaaaat tataaccatg    1560
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gtcattttgg gtgttatttg ctttgtcagt tatttcatgc aggattatt ttacggcaga     1680
gcaggggaaa ttttaacgat gagattaaga cacttggcct tcaaagccat gttatatcag    1740
gatattgcct ggtttgatga aaaggaaaac agcacaggag cttgacaac aatattagcc     1800
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```

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gcaactaaca tgggactttc agttatcatt tcctttatat atggatggga gatgacattc   1920

ctgattctga gtattgctcc agtacttgcc gtgacaggaa tgattgaaac cgcagcaatg   1980

actggatttg ccaacaaaga taagcaagaa cttaagcatg ctggaaagat agcaactgaa   2040

gctttggaga atatacgtac tatagtgtca ttaacaaggg aaaaagcctt cgagcaaatg   2100

tatgaagaga tgcttcagac tcaacacaga aatacctcga agaaagcaca gattattgga   2160

agctgttatg cattcagcca tgcctttata tattttgcct atgcagcagg gtttcgattt   2220

ggagcctatt taattcaagc tggacgaatg accccagagg gcatgttcat agtttttact   2280

gcaattgcat atggagctat ggccatcgga aaaacgctcg ttttggctcc tgaatattcc   2340

aaagccaaat cggggggctgc gcatctgttt gccttgttgg aaaagaaacc aaatatagac   2400

agccgcagtc aagaagggaa aaagccagac acatgtgaag ggaatttaga gtttcgagaa   2460

gtctctttct tctatccatg tcgcccagat gttttcatcc tccgtggctt atccctcagt   2520

attgagcgag gaaagacagt agcatttgtg gggagcagcg gctgtgggaa aagcacttct   2580

gttcaacttc tgcagagact ttatgacccc gtgcaaggac aagtgctgtt tgatggtgtg   2640

gatgcaaaag aattgaatgt acagtggctc cgttcccaaa tagcaatcgt tcctcaagag   2700

cctgtgctct tcaactgcag cattgctgag aacatcgcct atggtgacaa cagccgtgtg   2760

gtgccattag atgagatcaa agaagccgca aatgcagcaa atatccattc ttttattgaa   2820

ggtctccctg agaaatacaa cacacaagtt ggactgaaag gagcacagct ttctggcggc   2880

cagaaacaaa gactagctat tgcaagggct cttctccaaa aacccaaaat tttattgttg   2940

gatgaggcca cttcagccct cgataatgac agtgagaagg tggttcagca tgcccttgat   3000

aaagccagga cgggaaggac atgcctagtg gtcactcaca ggctctctgc aattcagaac   3060

gcagatttga tagtggttct gcacaatgga aagataaagg aacaaggaac tcatcaagag   3120

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<210> 13

<211> 3702

<212> DNA

<213> Homo sapiens

<220>

<221> Note

<222> (723)..(723)

<223> n at position 723 represents any nucleotide (A, T, C or G)

<400> 13

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attagtggat gtctagtcca aactaacaca tactctttct tcaggttgac cctgtattat     180

gttggaatag gtgttgctgc cttgattttt ggttacatac agatttcctt gtggattata     240

actgcagcac gacagaccaa gaggattcga aaacagtttt ttcattcagt tttggcacag     300

gacatcggct ggtttgatag ctgtgacatc ggtgaactta cactcgcat gacagacatt      360

gacaaaatca gtgatggtat tggagataag attgctctgt tgtttcaaaa catgtctact     420

ttttcgattg gcctggcagt tggtttggtg aagggctgga aactcaccct agtgactcta     480

tccacgtctc ctcttataat ggcttcagcg gcagcatgtt ctaggatggt catctcattg     540

accagtaagg aattaagtgc ctattccaaa gctggggctg tggcagaaga agtcttgtca     600

tcaatccgaa cagtcatagc ctttagggcc caggagaaag aacttcaaag gtctttcctt     660

ttaaatataa caagatatgc ttggtttttat tttccccagt ggctactaag ttgtgttctg     720

ttntttgtaa ggtatacaca gaatctcaaa gatgcaaagg attttggcat aaaaaggact     780

atagcttcaa aagtgtctct tggtgctgtg tacttcttta tgaatggaac ctatggactt     840

gcttttttggt atggaacctc cttgattctt aatggagaac ctggatatac catcgggact     900

gttcttgctg ttttctttag tgtaatccat agcagttatt gcattggagc agcagtccct     960

cactttgaaa ccttcgcaat agcccgagga gctgccttttc atattttcca ggttattgat    1020

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gattttatca tggagtttcc taataaattt aatacattgg taggggaaaa aggagctcaa    1500

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attaaaaaag ctgatgaaca gatggagtca atgacatatt ctactgaaag aaagaccaac    1860
```

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tcacttcctc tgcactctgt gaagagcatc aagtcagact tcattgacaa ggctgaggaa    1920

tccacccaat ctaaagagat aagtcttcct gaagtctctc tattaaaaat tttaaagtta    1980

aacaagcctg aatggccttt tgtggttctg gggacattgg cttctgttct aaatggaact    2040

gttcatccag tattttccat catctttgca aaaattataa ccatgtttgg aaataatgat    2100

aaaaccacat taaagcatga tgcagaaatt tattccatga tattcgtcat tttgggtgtt    2160

atttgctttg tcagttattt catgcaggga ttattttacg gcagagcagg ggaaatttta    2220

acgatgagat taagacactt ggccttcaaa gccatgttat atcaggatat tgcctggttt    2280

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attcaaggag caacaggttc caggattggc gtcttaacac aaaatgcaac taacatggga    2400

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gccctcgata atgacagtga gaaggtggtt cagcatgccc ttgataaagc caggacggga    3540

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gttctgcaca atggaaagat aaaggaacaa ggaactcatc aagagctcct gagaaatcga    3660

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<210> 14

<211> 3621

<212> DNA

<213> Homo sapiens

<400> 14

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attagtggat gtctagtcca aactaacaca tactctttct tcaggttgac cctgtattat     180

gttggaatag gtgttgctgc cttgattttt ggttacatac agatttcctt gtggattata     240

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accagtaagg aattaagtgc ctattccaaa gctggggctg tggcagaaga agtcttgtca     600

tcaatccgaa cagtcatagc ctttagggcc caggagaaag aacttcaaag gtatacacag     660

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acgtctgccc tggattcaga aagcaagtca gctgttcaag ctgcactgga gaaggcgagc    1560
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aagagcatca agtcagactt cattgacaag gctgaggaat ccacccaatc taaagagata   1860

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atctttgcaa aaattataac catgtttgga aataatgata aaaccacatt aaagcatgat   2040

gcagaaattt attccatgat attcgtcatt ttgggtgtta tttgctttgt cagttatttc   2100

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aatgcacagt cagtgcagtg a                                                 3621
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<210> 15

<211> 2021

<212> DNA

<213> Homo sapiens

<220>

<221> Note

<222> (723)..(723)

<223> n at position 723 represents any nucleotide (A, T, C or G)

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attagtggat gtctagtcca aactaacaca tactctttct tcaggttgac cctgtattat        180

gttggaatag gtgttgctgc cttgattttt ggttacatac agatttcctt gtggattata        240

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gacaaaatca gtgatggtat tggagataag attgctctgt tgtttcaaaa catgtctact        420

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atgagtggag ggcagaaaca gaggatcgca attgctcgtg ccttagttcg aaaccccaag      1560

attctgattt tagatgaggc tacgtctgcc ctggattcag aaagcaagtc agctgttcaa      1620

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